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Tree Pest Leaflets
THE FIR BARK LOUSE

Adelges piceae Ratz

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Fig. 1—The appearance of the fir bark louse on the bark of balsam fir

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THE FIR BARK LOUSE

Adelges piceae Ratz

Distribution:—The fir bark louse, or balsam woolly aphid as it is called in Canada, occurs generally throughout our Northeastern States and in Southeastern Canada wherever balsam fir is found (MacAloney, 1935). It is of European origin and was reported on the coast of Maine as early as 1908, by A. D. Hopkins, then chief of the Division of Forest Insect Investigations, Bureau of Entomology, U. S. Department of Agriculture. Balch (1936) writes that "this insect was apparently introduced into North America from Europe forty or more years ago." Intensive scouting by the New York Conservation Department in 1935 and 1936 shows that the fir bark louse has been present in the Adirondack foothills for some years.

Host Trees:—Balsam fir (*Abies balsamea* (L.) Mill.) is the only host reported in the Northeastern States up to the present time. Annand (1928) has taken it, in California, on *Abies pectinata* D. C., *A. nobilis* Lindl., and *A. grandis* Lindl., and Balch (1934) has reared it on *A. nordmanniana* Spach. Although all of these tree species are grown in the northeastern part of the United States as ornamentals, no attack on them has yet been reported.*

Symptoms of Damage:—Attack by the fir bark louse is evidenced in two ways. On the trunk and larger branches it is characterized by white flocculent masses of waxen wool which cover the larvae and adults (Figure 1). On a heavily infested tree these may coalesce. Infestation on the twigs results in a condition often called "gout disease", because of the gouty, swollen appearance of the twigs and buds, which are usually killed (Figure 2). Balch (1936) has found that "A substance injected into the bark before feeding causes abnormal growth of the bark and wood." Large trees having only the "gout disease" type of injury die slowly, while heavily infested seedlings may die very quickly. A severe trunk attack generally kills the tree within a year. The needles turn red and in the forest a single tree or groups of dead and dying trees are conspicuous. In about one year the needles turn brown and begin to drop.

*In May 1937 subsequent to the preparation of this bulletin, the writer collected this species in two localities in New Jersey from a Japanese fir, **A. firma** S. & Z.

The sapwood assumes a dark brown appearance, and the outer annual rings are usually much enlarged locally. The wood is brittle and hard, and its value for lumber is considerably decreased.

At first a single tree in a stand is attacked, and as the insects on it increase, other trees surrounding it become infested. There is evidence that occasional trees may be immune to attack. All ages and sizes of balsam fir are attacked — trees in almost pure stands and in mixture with other tree species, on good as well as poor sites, and at all elevations from sea level to at least 3,000 feet. The chief means of dispersal from one tree to another or from one area to another is by the action of wind. The larvae may be carried long distances in this manner and to a much lesser extent by man, birds, and animals.

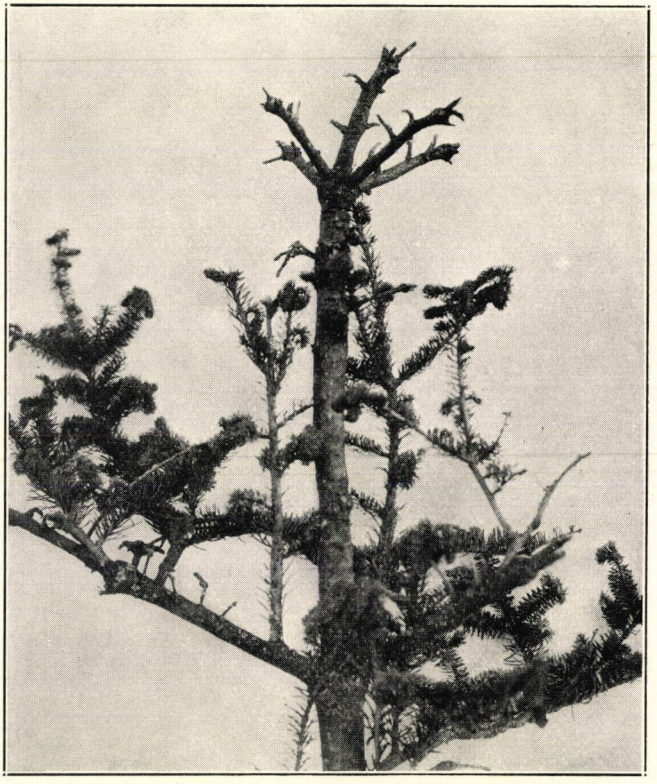

Fig. 2—The "gout disease" of balsam fir

Description of the Insect and Life History:—According to Balch (1936), "During the winter the small black larvae are less than half a millimetre long and have a white "fringe" and "back bone" of wax plates. They remain dormant, at the base of the buds, on the twigs, or on the stem. They prefer to settle in crevices and insert a slender tube about four times their own length into the bark. In the spring, about the time the buds begin to swell,

they begin to feed through this tube and develop into a black hemispherical form which is covered with curly wax threads. This is the adult female. It lays a mass of pale yellowish eggs behind it underneath the wax. There are no males. About the end of May the eggs begin to hatch and the small brown larvae, which can hardly be seen with the naked eye, crawl around until they find a suitable place on the bark. They then settle down, become black, and remain stationary. After a few weeks' rest they commence to develop and produce a second generation of larvae which overwinters."

Control:—Temperatures considerable below zero (Balch reports the killing temperature to be—30° F.) will kill practically all the larvae not protected by a covering of snow. After a severe winter, such as was experienced in New England in 1933-34, only those at the bases of the trees will survive.

Trees with trunk attack should be cut during the winter months and utilized immediately if possible, otherwise the bark should be scorched with a blowtorch or peeled and burned.

Experiments undertaken by the author in 1935 showed that an oil spray of a strength of 1 part to 25 parts of water, or a lime sulphur spray of a strength of 1 part to 20 parts of water, applied early in the spring before tree growth is resumed, were completely effective. Care should be taken that all parts of the trees are thoroughly drenched.

The Entomological Branch of the Canadian Department of Agriculture has imported one European predatory insect species and this has become established. The Bureau of Entomology and Plant Quarantine is planning to obtain some of these insects and liberate them in infested localities in New England.

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